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DISPATCH NO. LKG-A-27000

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TO : Chief, Foreign Division L
DATE: 27 February 1951
FROM : Chief of Station, Karlsruhe
SUBJECT: GENERAL -
SPECIFIC: Dr. Ing. Frank FRUENGEL — Torpedo Exploder

REFERENCE: LKG-A-24319, WASH-30167, KARL-1281

1. Dr. FRUENGEL was contacted at his laboratory in Hamburg-Rissen, Suelldorfer Land Strasse 400, on 21 February. His home address is Tensdaler Kirchenweg 251, Hamburg-Rissen, and his telephone number both at his home and his laboratory is 46-35-77.

2. The following information was obtained as requested in paragraph 2 of WASH-30167.

a. Sensitivity and Wave-Length Range of Receiver

The sensitivity of the receiver is 10^{-5} lumens or about 0.3×10^{-7} watts. The useful wave lengths possible are either in the infra-red or ultra-violet range and cover respectively 7000-8500 \AA and 3600-4200 \AA .

b. Conditions under which Test Firings were made

The exploder was developed ^{in Dr. Ing. Frank Frungel's laboratory} in Danzig during the period 1940-1944. Here tests and measurements were made to determine the efficiency of the equipment in water of various compositions. In the Summer of 1944 tests were begun at the Torpedoversuchsanstalt, Eckernfaerde bei Kiel. The Abteilung Leiter was (Dr.) LERP and FRUENGEL's group was under Wilfred ZWAKA, as FRUENGEL remained in Danzig.

Altogether 20 complete sets of equipment were made and 10 torpedoes of normal types were modified to use the exploders. The torpedoes were fired in a test area seven kilometers in length, using ships or simulated ships of various beams. The results of the tests with the exploder were determined by means of an oscillograph. At the end of the run a bouy was released by the torpedo by which the torpedo was recovered for further tests. In addition to using the oscillograph, a number of tests were made in which a marker was released at the time the torpedo would have exploded. No tests were made with a live warhead or in combat. Tests were run under

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various conditions of lighting, such as full sunlight, overcast, at night using searchlights, and on completely dark nights. The torpedo functioned perfectly in all conditions and in no instance was the signal light detected visually. These tests continued until about February 1945.

c. Stage of Development

The development of the exploder was considered complete in 1945 and it was accepted for use by the German Navy. Production of the equipment was scheduled to begin in the Summer of 1945 at Gema, Berlin-Koeppenick.

d. Electrical Installations and Capacities Necessary to Transmit Signal

The electrical equipment is small and simple. Required are battery, thriller, ignition coil, rectifier, pulse condenser, and spark gap. The model developed by FRUENGEL required 30-40 watts and operated on 24 volts and 500 cycles. These conditions can be varied to suit the electrical system in use in the torpedo. The capacity of batteries used was 1/2 ampere hours. The mirror for the transmitter is 15-20 centimeters in diameter.

The signal is picked up by a photo cell 5 to 8 cm² in size and a mirror of 15 to 20 cm in diameter. The receiver consists of 4 tubes (2 x RV12P2007, 2 x RV12P2000) and 1 Thyatron (EL50). The power supply for the receiver can be either a dry battery giving 120 volts and 15 milliamperes or a continuous current dynamotor.

3. Wilfred ZWAKA is working in Braunschweig producing similar equipment or parts for such equipment, and ZWAKA and FRUENGEL have business connections. Details such as ZWAKA's exact work, whether he is employed or has his own firm are not known.

4. ~~FRUENGEL stated that a~~ ^{received} complete model of the torpedo exploder could be ~~produced~~ ^{produced} in about six weeks in Germany for about 12,000 DMs. He stated the work could be completed quicker in Germany than if he had to do it in the US, as he would have all his equipment and personnel at hand. He said the high cost of the equipment is due to the fact that he employs only engineers in his laboratory as his work is specialized assembly and modification, with production of normal components being carried out in other firms. Although he prefers to construct the model in Germany where current licenses will legally permit him to do it, he recommends that US components such as tubes, be used.

5. The information given was completely from FRUENGEL's memory, as his documents pertaining to this work are still in Copenhagen. For that reason, he was unable to give in a short time a detailed electrical diagram.